Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
	)	
Review of the Commission's Rules	)	WT Docket No. 17-200
Governing the 896-901/935-940 MHz Band	)	

COMMENTS OF SENSUS USA INC.

Sensus USA Inc. ("Sensus") is pleased to submit comments in response to the Federal Communications Commission's above-captioned *Notice of Proposed Rulemaking* to introduce broadband services in the 896-901 MHz and 935-940 MHz bands (together, the "900 MHz band")[1].

Sensus enables critical infrastructure companies, including electric, gas, and water utilities, to manage their infrastructure safely and efficiently using the Sensus FlexNet radio system. The FlexNet system utilizes licensed narrowband PCS ("NPCS") spectrum in the 901-902 MHz, 930-931 MHz, and 940-941 MHz bands to provide customers secure and reliable connectivity solutions. This includes advanced metering infrastructure solutions, system distribution automation, monitoring, and control, and demand response. More than 1,200 customers rely on the Sensus FlexNet communication network and NPCS spectrum to connect more than 15 million smart devices used for smart-city, -water, -gas, -grid, and -lighting applications, and more. The NPCS frequencies are immediately above the 900 MHz band.

Sensus supports the FCC's proposal to create a paired three megahertz ("3/3 megahertz") broadband segment in the 900 MHz band and preserve narrowband segments above and below

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[1] *Review of the Commission's Rules Governing the 896-901/935-940 MHz Band*, Notice of Proposed Rulemaking, WT Docket No. 17-200, FCC 19-18 (rel. Mar. 14, 2019) ("*NPRM*").

the broadband segment.[2] This proposal, together with proposed technical rules for the broadband segment, serves the Commission's goal to "create opportunities for robust broadband networks" while presumptively protecting operations in the 900 MHz band and adjacent spectrum.[3]

Given the importance of critical infrastructure industries ("CII") operations in adjacent NPCS spectrum, Sensus urges the Commission to take additional steps to ensure their protection. The FCC can further safeguard incumbent NPCS operators by:

1. stating that broadband licensees in the 900 MHz band will be responsible for preventing harmful interference to NPCS operations and resolving any interference at their expense in the shortest time practicable (as it has proposed to do for narrowband operations in the 900 MHz band);

2. ensuring that Part 27 and Part 90 of the FCC's rules require cooperation between licensees in the event of harmful interference and provide authority for the Commission to impose operational restrictions or tighter out-of-band emissions ("OOBE") limits if necessary to resolve harmful interference; and

3. requiring broadband segment proponents to conduct real-world testing simulations prior to deployment.

These reasonable measures would allay remaining concerns regarding protection of NPCS operations. They encourage new broadband entrants to consider their effect on adjacent operators and establish mechanisms for resolving instances of harmful interference.

Finally, the Commission must reject proposals that would jeopardize CII operations in adjacent NPCS spectrum, such as the proposal for a paired 5 megahertz ("5/5 megahertz") broadband segment. Any proposal that would authorize broadband operations in spectrum immediately adjacent to or near the 901-902 MHz or 940-941 MHz bands would harmfully interfere with NPCS operations. This would prevent operators like Sensus from providing robust

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2 *See id.* ¶¶ 10-12, 15-18.

3 *Id.* ¶¶ 8, 15.

and reliable services upon which CII customers depend to manage their systems safely and efficiently.

I. SENSUS SUPPORTS THE COMMISSION'S 3/3 MEGAHERTZ PROPOSAL AND ACCOMPANYING TECHNICAL RULES, WHICH WOULD MODERNIZE THE 900 MHZ BAND WHILE LIKELY SAFEGUARDING ADJACENT BAND SERVICES.

Sensus applauds the FCC's dedication to increasing access to flexible use spectrum and facilitating deployment of next-generation services for consumers. We agree with the Commission that opening part of the 900 MHz band to broadband services may benefit consumers, including enterprise consumers. For example, broadband services could provide greater coverage and increased reliability to Business/Industrial/Land Transportation ("B/ILT") operators.

Any changes to the 900 MHz band plan, however, must protect adjacent band services. CII operators depend upon NPCS spectrum to monitor and manage their systems, as well as provide improved customer service. Sensus customers use the FlexNet communications network to visualize operations at any point in the system, enabling quick and informed response. Customers get real-time data with prioritized alarms to maintain the safety of both employees and the public. And information on system use enables customers to invest wisely and plan for future demands on their systems. NPCS services must therefore be highly reliable and resilient. Securing NPCS spectrum reliability and resiliency is particularly important in rural areas where fiber services are often unavailable. In those instances, NPCS spectrum is the only connection CII operators have to their systems.

Sensus supports the FCC's proposal to create a 3/3 megahertz broadband segment at 897.5-900.5 MHz and 936.5-939.5 MHz and to preserve narrowband segments above and below

the broadband segment.[4] The narrowband segments will consist of a paired 1.5 megahertz ("1.5/1.5 megahertz") segment at 896-897.5 MHz and 935-936.5 MHz and a paired 0.5 megahertz segment ("0.5/0.5 megahertz") at 900.5-901 MHz and 939.5-940 MHz. The FCC's proposal appropriately recognizes the importance of protecting NPCS operations in the adjacent band from harmful interference. By locating the 0.5/0.5 megahertz narrowband segment in this way, the Commission establishes 500-kilohertz separation between the 3/3 megahertz broadband segment and adjacent NPCS spectrum. Sensus acknowledges, and appreciates sincerely, that this separation is greater than the 400-kilohertz minimum separation Sensus previously explained would be necessary based on information available.[5] A 500-kilohertz guard band should reduce the risk of harmful interference into adjacent channels, assuming the noise level from narrowband segment operations in the 900 MHz band remain substantially unchanged.

Sensus also supports the proposed technical rules for broadband segment licensees, including an OOBE limit of 43 + 10 log (P) dB for uplink operations in the 897.5-900.5 MHz band and 50 + 10 log (P) dB for downlink operations in the 936.5-939.5 MHz band.[6] Sensus agrees that an asymmetrical emission mask would offer greater protections for NPCS operations against harmful interference. The proposed OOBE limits, in combination with the agency's 3/3 megahertz proposal, would thus provide consumers with access to broadband services from the 900 MHz band while helping to shield NPCS operations from harmful interference.

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4 *See id.* ¶ 15.

5 *See* Further Comments of Sensus USA Inc., WT Docket No. 17-200, at 3 (filed May 24, 2018) ("Further Comments of Sensus").

6 *See NPRM*, ¶ 75 and Appendix A (Proposed Rules) § 27.1525.

II. THE FCC SHOULD TAKE ADDITIONAL STEPS TO ENSURE PROTECTION OF INCUMBENT OPERATORS IN ADJACENT BANDS.

Considering the need for reliable and resilient NPCS services, Sensus recommends the Commission adopt three reasonable measures to further protect operations in the 901-902 MHz and 940-941 MHz bands from harmful interference. *First*, the Commission should confirm that 900 MHz band licensees in the broadband segment will be responsible for preventing harmful interference to NPCS operations and resolving, at their expense, any interference in the shortest time practicable. The FCC proposes to take this position for narrowband operations in the 900 MHz band.[7] Sensus requests that a similar statement be made regarding harmful interference to NPCS operations in the adjacent 901-902 MHz and 940-941 MHz bands.

Second, the FCC should ensure that the Part 27 and Part 90 rules require cooperation between licensees in the event of harmful interference and provide authority for the Commission to impose operational restrictions or tighter OOBE limits if necessary to resolve harmful interference. Specifically, Sensus recommends that the Commission add a new subparagraph to Section 27.1525 that would state—as is common in other emissions limits rules, such as Section 90.691(h)[8]—that "When an emission outside of the authorized bandwidth causes harmful interference, the Commission may, at its discretion, require greater attenuation than specified in this section." In addition, the Commission should add a new section to the Part 27 rules that

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7 *NPRM*, ¶ 73 ("We propose to make broadband licensees responsible for preventing harmful interference to narrowband operations and for resolving any interference in the shortest time practicable.") (citing 47 C.F.R. § 2.1(c), which defines "harmful interference" as "interference which endangers the functioning of a radionavigation service or of other safety services or seriously degrades, obstructs, or repeatedly interrupts a radiocommunication service operating in accordance with the ITU Radio Regulations.").

8 *See* 47 C.F.R. § 90.691(h).

aligns with Section 90.173(b) from the Part 90 rules.[9] This would require Part 27 licensees suffering and causing harmful interference to cooperate in resolving such interference. It would also give the Commission authority to impose restrictions on broadband segment operations in the 900 MHz band, if licensees cannot resolve the interference issue. Although Sensus and pdvWireless, Inc. ("PDV") have entered into a written contract to help the parties work through any interference between broadband operations in the 900 MHz band and adjacent NPCS operations,[10] other parties besides PDV will likely obtain broadband PCS licenses. The above rule changes are therefore needed to set ground rules should harmful interference occur.

Although Sensus does not believe it is necessary at this time for the Commission to set further overall limits on broadband transmitter operations,[11] such measures should be used by broadband operators, and imposed by the Commission, to resolve harmful interference to NPCS and narrowband 900 MHz operations. Solutions could include tighter broadband transmitter OOBE filtering, attenuation of broadband transmitter power levels, and limits on broadband transmitter data traffic. For example, limiting the traffic or number of broadband users on broadband LTE subcarriers near the band edge, or limiting the power of those broadband

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9 *See* 47 C.F.R. § 90.173(b) ("All applicants and licensees shall cooperate in the selection and use of frequencies in order to reduce interference and make the most effective use of the authorized facilities. Licensees of stations suffering or causing harmful interference are expected to cooperate and resolve this problem by mutually satisfactory arrangements. If the licensees are unable to do so, the Commission may impose restrictions including specifying the transmitter power, antenna height, or area or hours of operation of the stations concerned. Further the use of any frequency at a given geographical location may be denied when, in the judgment of the Commission, its use in that location is not in the public interest; the use of any frequency may be restricted as to specified geographical areas, maximum power, or such other operating conditions, contained in this part or in the station authorization.").

10 *See* Further Comments of Sensus, at 3.

11 *See NPRM*, ¶ 74 (requesting comment on "whether [the FCC] should consider other harmful interference mitigation methods, such as limits on LTE transmitter power or additional transmitter filtering requirements").

operations, may be needed to mitigate the risk of harmful interference to NPCS operations in some cases. LTE resource blocks could also be disabled and filtering increased close to the broadband segment edge without interfering with broadband operations towards the center of the channel.

Finally, the Commission should encourage future 900 MHz band broadband operators to conduct real-world testing prior to deployment. Such testing would confirm our expectation that NPCS operations will be protected and provide an opportunity to address any unforeseen issues prior to the full deployment of broadband services in the 900 MHz band. Sensus shares the Commission's understanding that a 500-kilohertz separation between broadband operations in the 900 MHz band and NPCS spectrum, along with the proposed OOBE limits and rule modifications proposed above, may sufficiently protect CII operations from harmful interference. However, this conclusion was not based on real-world analysis. Submissions to-date have relied on incorrect or best-case-scenario assumptions.[12] And as Sensus has long emphasized, reconfiguration of the 900 MHz band must be based on realistic technical assumptions drawn from empirical evidence.[13]

The Commission should therefore require broadband proponents to demonstrate—through robust case study analysis and equipment testing—that CII operations in the adjacent band will be protected from harmful interference. Positive test results will provide needed assurances to adjacent band operators that have invested considerable resources into their

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12 *See, e.g.*, Comments of Enterprise Wireless Alliance and pdvWireless, Inc., WT Docket No. 17-200 (filed Oct. 2, 2017); Comments of Pericle Communications Company, WT Docket No. 17-200 (filed Oct. 2, 2017).

13 *See* Comments of Sensus USA Inc., WT Docket No. 17-200, at 3, 6-17 (filed Oct. 2, 2017) ("2017 Sensus Comments"); Reply Comments of Sensus USA Inc., WT Docket No. 17-200, at 3-4, 11 (filed Nov. 1, 2017) ("2017 Sensus Reply Comments").

systems and will also help ensure that broadband PCS licensees have more certainty that the proposed rules will enable them to meet their obligations to avoid (and correct) harmful interference. Sensus stands ready to work with all interested stakeholders to provide guidance on such testing.

III. THE COMMISSION SHOULD REJECT ALTERNATIVE PROPOSALS, SUCH AS THE 5/5 MEGAHERTZ PROPOSAL, WHICH WOULD IMPAIR ADJACENT NPCS OPERATIONS.

The record demonstrates that authorizing broadband operations in spectrum immediately adjacent to or near the 901-902 MHz and 940-941 MHz bands would irreparably harm NPCS operations. The Commission previously requested comment on a 3/3 megahertz broadband proposal and a 5/5 megahertz broadband proposal that would enable broadband operations adjacent to NPCS spectrum with little or no narrowband segment acting as a guard band.[14] It also sought comment on a proposal to preserve the existing 900 MHz band plan, but eliminate or relax the channel aggregation limit to allow for broadband use.[15] Sensus submitted extensive technical studies and other filings in response to the initial 3/3 megahertz proposal and found that OOBE would "result[] in a far greater level of interference" than suggested by proposal advocates.[16] The remaining proposals would similarly render services in NPCS spectrum unusable, because they would allow broadband operations adjacent to NPCS spectrum. Sensus's

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14 *Review of the Commission's Rules Governing the 896-901/935-940 MHz Band,* Notice of Inquiry, 32 FCC Rcd 6421, ¶¶ 27-28 (2017).

15 *Id.* ¶¶ 19-25.

16 2017 Sensus Comments at 2, n.3 and Attachment 1, at 76 (cross-referencing prior submissions and providing a detailed technical analysis by Real Wireless Ltd., an independent wireless advisory firm). *See also* Sensus Reply Comments, Attachment 1, at 15 ("The content of [reports by DBA Consulting and Pericle Communications Company] does not change the detail or conclusions set out in our 2015 review, which is just as appropriate today as it was then.").

interference concerns were echoed by NPCS service users.[17] Yet no commenter could satisfactorily address the cumulative effect broadband operations at or near the 901-902 MHz or 940-941 MHz bands would have on adjacent NPCS operations.[18]

NPCS spectrum incumbents have a right to protection from harmful interference. NPCS users designed their systems to maximize reliability and resiliency considering the then-existing interference environment. Indeed, the noise floor in the 901-902 MHz and 940-941 MHz bands has been at or below -168.5 dBm/Hz for nearly 15 years. Incumbents invested considerable resources, including over one billion dollars in infrastructure, based on the reasonable expectation that the NPCS band would continue to receive minimal OOBE from 900 MHz operations. Given the reasonable reliance interest of incumbent NPCS operators, the FCC must reject the 5/5 megahertz proposal and any other that would threaten NPCS operations and undermine the investment made by the CII.

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[17] *See, e.g.,* Comments of Southern Company Services, Inc., WT Docket No. 17-200, at 11 (filed Oct. 2, 2017) ("The band plan initially proposed by EWA and PDV would pose the highest risk of interference to licensees in the adjacent NPCS band, as it would put the proposed new broadband operations right up against the NPCS band with effectively no guard band or other separation between these two services."); Comments of The Critical Infrastructure Coalition, WT Docket No. 17-200, at 9 (filed Oct. 2, 2017) ("Allowing broadband operations in the 900 MHz band . . . would cause harmful interference to incumbent mission-critical communications in the band as well as critical communications uses in adjacent spectrum."); Comments of Sensus Partners and Advisors Network, WT Docket No. 17-200, at 4 (filed Oct. 2, 2017) (describing the interference that would be caused by PDV's initial proposal as "devastating").

[18] *See* 2017 Sensus Reply Comments, at 6-7 (citing Comments of A Beep, LLC, WT Docket No. 17-200, at 1 (filed Oct. 2, 2017), Comments of General Dynamics Mission Systems, WT Docket No. 17-200 (filed Sept. 18, 2017), and Comments of Puloli, Inc., WT Docket No. 17-200 (filed Oct. 2, 2017), Comments of Comtronics Corporation, WT Docket No. 17-200 (filed Sept. 21, 2017), and Comments of Teleworld Solutions, WT Docket No. 17-200 (filed Oct. 2, 2017)).

IV. CONCLUSION

For the reasons stated above, Sensus recommends the FCC move forward with its proposal with the modifications discussed above to create a 3/3 megahertz broadband segment at 897.5-900.5 MHz and 936.5-939.5 MHz, while also encouraging future broadband operators in this spectrum to begin interference testing. Such testing will ensure protections for adjacent NPCS operations, providing ample time to address any unforeseen interference concerns.

Respectfully submitted,

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Dated: June 3, 2019